

IN THE CLAIMS

1-76 (Canceled)

77. (New) A receiving apparatus for receiving signals in a digital telecommunication system, comprising:

receiving means for receiving a reference symbol including a plurality of repetition patterns, wherein each repetition pattern includes a number of complex samples, the number of complex samples being the same in each repetition pattern, and wherein one of the repetition patterns is phase-shifted in relation to the other repetition patterns; and

synchronizing means for synchronizing the receiving apparatus in the digital telecommunication system using the received reference symbol, said synchronizing means comprising (1) correlation means for cross-correlating said reference symbol received in said receiving means, and (2) detecting means for detecting a phase of each of the plurality of repetition patterns in said reference symbol and a correlation peak that indicates a position of the phase-shifted repetition pattern,

wherein said detected phases of each of said plurality of repetition patterns and said detected correlation peak are used in said synchronizing means for synchronizing the receiving apparatus in the digital telecommunication system.

78. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 77, wherein the phase-shifted repetition pattern is phase-shifted by 180° in relation to the other repetition patterns.

79. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 77, wherein said correlation means uses a

correlation window with a correlation window length corresponding to a length of one repetition pattern, wherein an output signal of said correlation means is supplied to said detection means for detecting the correlation peak.

80. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 79, wherein said detection means comprises (1) a delay means for delaying the output signal of said correlation means by one repetition pattern length, and (2) a subtraction means for subtracting an output signal of said delay means from the output signal of said correlation means.

81. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 80, wherein said synchronizing means further comprises averaging means for smoothing an output signal of said detection means.

82. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 77, wherein said correlation means uses a correlation window with a correlation window length corresponding to a length of two repetition patterns.

83. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 82, wherein said correlation means uses a positive and a negative conjugation of an expected repetition for detecting a position of said correlation peak.

84. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 77, wherein an output signal of said detecting means is supplied to peak threshold detection means and gap detection means, wherein said correlation peak detected by said detecting means is confirmed or not based on detection results of said peak threshold detection means and said gap detection means.

85. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 84, wherein said peak threshold detection means detects if the output signal of the detecting means exceeds a predetermined correlation peak threshold, and the gap detection means detects if the output signal of said detecting means has been below a predetermined gap threshold before said detected correlation peak.

86. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 85, further comprising delay means for delaying the output signal of said detecting means before the output signal is supplied to said gap detecting means.

87. (New) The receiving apparatus for receiving signals in the digital telecommunication system according to claim 85, wherein said gap detection means detects if the output signal of said detecting means has been below said predetermined gap threshold during a predetermined gap time.

88. (New) A method for synchronizing a receiving apparatus in a digital telecommunication system, comprising:

receiving a reference symbol including a plurality of successive repetition patterns, wherein each repetition pattern includes a number of complex samples, the number of complex samples being the same in each repetition pattern, and wherein one of the plurality of repetition patterns is phase-shifted in relation to the other repetition patterns;

cross-correlating said received reference symbol to generate an output signal; detecting a phase of each of the plurality of repetition patterns in said reference symbol and detecting a correlation peak that indicates a position of the phase-shifted repetition pattern; and

synchronizing the receiving apparatus in the digital telecommunication system using said detected phases of each of said plurality of repetition patterns and said detected correlation peak.

89. (New) The method according to claim 88, wherein said phase-shifted repetition pattern is phase-shifted by 180° in relation to the other repetition patterns.

90. (New) The method according to claim 88, wherein, in said correlating step, a correlation window is used that has a correlation window length corresponding to a length of one repetition pattern.

91. (New) The method according to claim 90, wherein said detecting step comprises: delaying the output signal generated in said correlation step by one repetition pattern length, and subtracting the delayed output signal from the output signal generated in said correlation step to generate a detection output signal.

92. (New) The method according to claim 91, further comprising:

smoothing the detection output signal.

93. (New) The method according to claim 88, wherein, in said correlation step, a correlation window is used that has a correlation window length corresponding to a length of two repetition patterns.

94. (New) The method according to claim 93, wherein said correlation step uses a positive and a negative conjugation of an expected repetition pattern for detecting a position of said correlation peak.

95. (New) The method according to claim 88, wherein steps of peak threshold detection and gap detection are performed after said detecting step, and wherein said correlation peak detected in said detecting step is confirmed or not based on the detection results of said peak threshold detection step and said gap detection step.

96. (New) The method according to claim 95, wherein said peak threshold detection step detects if the detection output signal exceeds a predetermined correlation peak threshold, and said gap detection step detects if the detection output signal has been below a predetermined gap threshold before said detected correlation peak.

97. (New) The method according to claim 96, further comprising:  
delaying the detection output signal before said gap detection step is performed.

98. (New) The method according to claim 96, wherein the step of gap detection comprises:

detecting if the detection output signal has been below said predetermined gap threshold during a predetermined gap time.